

not compensated after changing the exposure period. Independent method claim 18 has been similarly amended. In addition, independent apparatus claims 16 and 17 and corresponding independent method claims 19 and 20 recite similar features, but contain other features as further discussed below. As illustrated in the discussion below, such a construction is not taught or suggested by the cited art of record.

The present invention, as recited in Applicant's claims 15-20, is characterized, in general, by compensating the loss in exposure amount that is caused by the delay in closing the light-shielding unit by:

- changing the set exposure period if the exposure period is longer than a predetermined period, and
- by changing the gain to be applied to the charge signal if the exposure period is equal to or shorter than that predetermined period.

In addition, in accordance with the present invention, and as recited in Applicant's independent apparatus claim 15 (and corresponding method claim 18), if the set exposure period is longer than the designated predetermined period and if the compensation amount for compensating a loss in exposure amount for the image sensing element caused by the delay in closing the light-shielding unit is greater than an upper limit of a compensation amount of the exposure period, then:

- the control unit changes the exposure period based on the upper limit of the compensation amount of the exposure period; and
- changes the gain so as to compensate the rest of the compensation amount which is not compensated after changing the exposure period based on the upper limit.

Further, and in accordance with the present invention, as recited in Applicant's independent apparatus claim 16 (and corresponding method claim 19), if the set exposure period is equal to or shorter than the predetermined period and if the compensation amount for compensating the loss in exposure amount for the image sensing element that is caused by the delay in closing the light-shielding unit is greater than the upper limit of compensation amount for the gain to be applied to the charge signal, then:

- the control unit changes the gain based on the upper limit of compensation amount of the gain; and
- changes the exposure period so as to compensate the rest of the compensation amount which is not compensated after changing the gain based on the upper limit.

Still further, and in accordance with the present invention, as recited in Applicant's independent apparatus claim 17 (and corresponding method claim 20), even if the image sensing mode as set by the image sensing mode setting unit is an image sensing mode of controlling exposure by keeping an exposure period set by the setting unit, if the set exposure period is longer than the predetermined period:

- then the control unit changes the set exposure period based on the compensation amount for compensating the loss in exposure amount for the image sensing element that is caused by the delay in closing the light-shielding unit.

In the Office Action, the Examiner, in addressing the arguments submitted in the prior amendment, asserted that the claims as previously amended did not disclose particular limitations that were being previously relied upon by the Applicant to distinguish the claimed invention from the cited art (Office Action, page 3, line 20 to page 4, line 5). As can be

appreciated from the above discussion of Applicant's claims, it is now submitted that the claims, as amended herein, now sufficiently recite such features that are neither disclosed nor suggested in the cited art, as further discussed below.

AAPA discloses a technique for providing exposure compensation in an image sensing apparatus by changing the exposure period in order to compensate for a loss in the exposure amount for the image sensing element that is caused by the delay in closing the light-shielding unit. However, AAPA is silent with regard to setting an upper limit in the compensation amount for the exposure period upon compensating the loss and compensating for the rest of the loss, which cannot be compensated by changing the exposure period based on the upper limit of the exposure period, by changing the gain to be applied to the charge signal, as recited in Applicant's amended claim 15. It is noted that the Examiner, in the Office Action, acknowledged that "AAPA does not teach changes [sic] a gain to be applied to the charge signal based on the compensation amount determined by said determination unit ..." (Office Action, page 5).

Shibuya discloses changing an exposure time so that the signal level of a video signal S12 (Figs. 1A, 1B, 2) approaches a reference value, and in the case when the exposure time has to be lengthened to be above the longest exposure time that is stored in memory, the exposure time is set to the shortest exposure time, and the gain of the amplifier is increased by one step, as discussed in column 7, lines 48-54 of Shibuya.. However, this functionality in Shibuya is distinctly different from that of the present application as recited in Applicant's claim 15. In particular, in Shibuya, the exposure time is shortened when the gain is increased, whereas in the present invention and as recited in claim 15, the exposure period is changed based on the upper

limit of the compensation amount, and only the rest of the compensation amount which cannot be compensated by changing the exposure period based on the upper limit is compensated by changing the gain. Hence, this feature of Applicant's claim 15 is neither disclosed nor suggested in Shibuya.

In connection with Applicant's amended claim 16, neither cited reference discloses or suggests the recited feature that if the set exposure period is equal to or shorter than the predetermined period and if the compensation amount determined by the determination unit is greater than an upper limit of compensation amount of gain to be applied to the charge signal, the control unit changes the gain based on the upper limit of compensation amount of gain and changes the exposure period so as to compensate the rest of the compensation amount which is not compensated after changing the gain. As addressed above, and as acknowledged by the Examiner (Office Action, page 8, lines 1-3), AAPA does not disclose changing the gain to be applied to the charge signal based on the compensation amount if the exposure period is equal to or shorter than the predetermined period. Hence, AAPA does not disclose this feature recited in Applicant's claim 16.

Shibuya also does not disclose such feature. Instead, Shibuya discloses changing the gain of the amplifier so that the signal level of video signal S12 approaches the reference value, and in the case when the gain of the amplifier has to be increased to above the largest gain value stored in the memory, the gain is set to the smallest value, and the exposure time is increased by one step, as discussed in column 8, lines 21-26 of Shibuya. More particularly, Shibuya teaches that the gain is reduced when the exposure time is increased, whereas the present invention, as recited in Applicant's claim 16, changes the gain up to the upper limit of

the compensation amount, and only the rest of the compensation amount which cannot be compensated by changing the gain to the upper limit is compensated by changing the exposure period. Hence, Shibuya neither discloses nor suggests this feature of the present invention.

In connection with Applicant's claim 17, neither Shibuya nor AAPA discloses that, even when an image sensing mode for maintaining a set exposure period is set, if the set exposure period is longer than a predetermined period, then the exposure period is changed based on the compensation amount as determined by the determination unit.

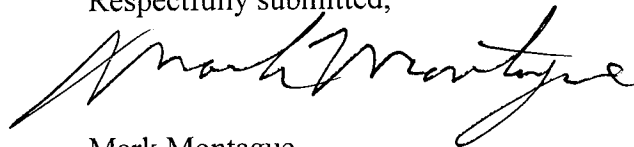
Therefore, neither of the cited references discloses the above-described features of Applicant's independent apparatus claims 15, 16 and 17. Hence, Applicant's claims 15, 16 and 17, as well as Applicant's independent method claims 18, 19 and 20 since they correspond respectively to claims 15, 16 and 17, thus patentably distinguish over the combination of AAPA and Shibuya.

In view of the above, it is submitted that Applicant's claims, as amended and newly presented, patentably distinguish over the cited art of record. Accordingly, reconsideration and allowance of the application and claims is respectfully requested.

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